

Pictures in Color

We have certain kinds of color pictures. How are those colored pictures made? Some of them seem to be colored by hand.—W. M.

THREE CLASSES OF COLOR FILMS.

As a substitute for the really, truly color picture which will show all the natural colors in a close reproduction of nature, there are today in general use for public exhibition three classes of colored picture films, all of which are very acceptable additions to the pictures when they are well done, and all of which unquestionably heighten the illusions of the pictures.

STAINED OR TINTED FILM.

First, there is the stained film. The effect is the same as if the screen were painted with some light color, and the black and white pictures from the lantern were thrown upon the tinted screen. The picture is black on red, or black on green, or black on orange, etc. The effect is produced by dyeing or staining the gelatine of the picture film, the transparent portions of the picture film thus becoming tinted, and the black silver deposit of the picture remaining black. A most realistic coloring is given for a fire scene by a black and red picture by this process. Titles may be made less harsh by using a letter of any tint upon a black ground.

MONOCHROME FILM.

Second, there is the chemically tinted or colored-image film. In this film, the picture itself and not the screen appears colored. The colored film is secured by treating the film chemically to convert the black deposit of the picture into a colored substance, and yet to leave the transparent gelatine uncolored. This is done easily, the colored deposit of the images being secured either directly by special development of the print or indirectly by treatment of the film subsequent to development. The resulting picture is green on white or blue on white, etc.

A green-on-white surf scene, with the breaking waves showing white caps on the green water, is very realistic. Blue images upon a white curtain suggest moonlight, and are very widely used either to indicate moonlight, or to indicate a darkened room after a lamp has been extinguished.

The two foregoing methods are inexpensive in the manufacture of films, and are extensively used; but they do not come under the scope or fill the requirement of a colored film which will exhibit all the colors of nature.

HAND-COLORED FILM.

Third is the hand-colored film. In this method of coloring films, the black-and-white print is taken and colors are laid on by brushes in the skilled hands of colorists specially trained for the work. The little pictures are colored one at a time, and the process is

tedious and slow. The cost of coloring may run as high as sixteen cents per foot upon a film costing at retail only twelve cents per foot, uncolored.

Hand coloring must be done with great accuracy, if it is to be acceptable when projected upon the screen. When projecting a twenty-foot picture upon a screen, each image of the film is magnified to something like 58,000 times its original size, the picture upon the screen being 240 times as wide and 240 times as high as the picture in the film. Thus, a variation in placing the coloring by hand of one sixty-fourth of an inch will bring the color four inches away from where it belongs on the screen.

EXTREME LABOR IN HAND COLORING.

The large amount of labor required to color a single picture by hand renders the production of such pictures in commercial quantities a serious problem. With colorists completing thirty-five feet of picture film per day, or 200 feet per week, four weeks would be required to color a 1,000-foot picture, allowing 200 feet of the film for titles not requiring hand coloring.

A manufacturer releasing one colored picture once each month, and selling one hundred prints of it, would require one hundred skilled colorists to produce the work. "Colored to order," on the other hand, requires delay to color the picture after it has been ordered, but that is the only way to get hand-colored pictures today.

MACHINE-COLORED FILM.

Machine-colored pictures are being produced by Pathé Frères commercially, the present output being at about the rate of one picture released per week. These pictures are properly classified as "hand-colored" because the color apparently is laid upon the film after it has been printed in the regular way. The distinction between hand-colored and machine-colored pictures is not seen in the projected picture upon the screen, and the Pathé product may properly be called hand-colored so far as the resultant picture is concerned. The process of producing the Pathé colored picture is held secret at present, and all of their colored pictures are made in France.

The Color Question Again

Is anyone making motion pictures in colors directly from nature? If not, is there a color process near perfection, or is it likely that we shall get such pictures?—A. L. E., Illinois.

HISTORICAL.

It is hardly likely that any process of motion pictures in the colors of nature will spring complete from an inventor's brain and take undisputed prestige in the art. Waving aside such a possibility in all its features except the hope that it may come true, a brief study of what has been done is the best answer which can be given.

To make a picture in any single color desired is so easy that it has been done from the beginning. It is when two or more colors are required upon the screen at the same time that true color work begins.

Already upon the market there is, first, the genuine hand-colored film. Next, there is the imitation hand-colored film, the difference being that the coloring or dye is applied to the film by some method other than by a brush held in the hand of the colorist. Such methods as may exist for coloring films in imitation of hand coloring are kept secret, but even the best of them are not supremely satisfactory.

ATTEMPTS BY INDIRECT COLOR PHOTOGRAPHY.

Some development has been made very recently in the matter of producing pictures in natural colors without the resort to hand coloring or such subterfuges. The theory used is that of "indirect" color photography, by which term is meant the resolution of the colors of na-

ture into a few component or so-called "primary" colors, the photographing of these primary colors separately and the recombining of those colors after photographing, it being the object to recombine them in such manner and in such proportions of intensity as to reproduce the impressions which were created by the original subject photographed.

TWO METHODS.

Two methods have been adopted by different experimenters. These may be termed simultaneous projection and alternate projection.

SIMULTANEOUS PROJECTION.

It is well known in lantern slide work that a set of three slides, one red, one blue and one yellow, may be projected upon the same screen at the same time and that, if the slides have been prepared properly and the projecting light is proper, the three colored pictures will combine to give modulations of color closely approximating the original subject. This is called simultaneous projection, or superprojection, since the pictures are thrown on top of each other, as it were.

Experimenters who have attempted simultaneous projection in the realm of motion pictures have paralleled almost exactly the processes of lantern slide making. One result has been a color film three inches wide, or, more accurately, three pictures wide, the red, yellow and blue images being side by side, and being projected upon the screen simultaneously, where they blend to give the colors of nature. Obviously a special projector motion head must be used.

BI-COLOR PHOTOGRAPHY.

Another experimenter has reduced the number of pictures to two in this process, making the two pictures of red and green (or any other two complementary colors, it is presumed, may be used), the two pictures being made in this instance from the same lens and projected from the same lens, a prism being interposed between the lens and the sensitive film to separate the images. This same prism or its equivalent is used to combine the two images in projection.

The two-color theory remains to be demonstrated as a successful means for analyzing and recombining light to produce all of the tints of nature, yet this is one of the possibilities. The use of two colors instead of three simplifies the manufacture of film for projection in colors to such an extent that if the results are at all acceptable the two-color process probably will come widely into use by reason of its simplicity in manufacture, in photographing and in projecting.

ALTERNATE PROJECTION.

Another line along which another set of inventors have been working is that of alternate projection as a substitute for simultaneous projection. The theory in this method of projection is the same as that in which the fundamental principle of the motion picture is found. It is the principle of the persistence of vision.

Simply stated, the spectator before the screen upon which a monochrome motion picture is being projected sees two pictures most of the time, since at every one of the changes of picture, which occur fourteen per second, the new picture is seen before the old one fades from the

eye. This principle is taken into account by the alternate method of projection for pictures in colors, and a red and a green picture (for instance) are thrown upon the screen with such speed, although successively, from the same film and through the same lens, that the eye still sees the red picture while the green picture is upon the screen, and, after the next change still sees the green picture while the new red picture is upon the screen. It is necessary to project the pictures upon the screen very much faster than fourteen per second, and thirty-two per second has been experimented with, giving good results. The effect is reported as being pleasing, and not tiring to the eyes, the blending of color taking place very smoothly.

A COMPARISON.

Bi-color projection by the alternative-projection method requires substantially twice the number of pictures per second that is required in projection with ordinary monochrome film. Bicolor projection with simultaneous projection also requires twice the number of pictures, but projects two at once, keeping both of them upon the screen for the full length of the usual picture interval of the ordinary monochrome picture. This would seem to say that the brilliancy of the resulting picture upon the screen would be greater with the simultaneous-projection method than with the alternative-projection method. This feature alone should encourage the simultaneous projectors to continue their effort, and would indicate that the greater hope for success should be based upon their experiments.

In brief reply to your first question, it may be said that such pictures are not offered upon the market as yet.